

**TSUNAMI DEVASTATION IN INDONESIA:
THE ROLE OF COOPERATION AND SCHOLARLY COMMUNICATION TO
SUSTAIN ITS FISHERIES INFORMATION.**

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ABSTRACT: Fish is an important source of animal protein for rural households in many countries of Asia, especially in Indonesia, that provide as much as 30 - 70% of the total animal protein intake. As the population of Indonesia is projected to be 258.2 million, thus, the need for fish supply will dramatically increase. The improvement of the fisheries sector for increased production will largely depend on effective generation and dissemination of information on fisheries and aquaculture and related fields.

Inadequate fisheries information provision to the rural areas, where the bulk of our population live, as well as powerful earthquake and colossal wave which struck off the northwest coast of the Indonesian island of Sumatra, which spawned tsunamis and wreaked havoc along much of the rim of those areas have caused serious problem in the fisheries development. The decline in fish production is affecting rural households the most, at times leading to malnutrition in low-income households.

The importance of information on fisheries and aquaculture and related fields for strengthening of its national information services for fisheries, as well as to communicate research results to various users in Indonesia and other countries in Southeast Asia has urged Indonesian government to establishment a "Fishery Information Center. Cooperation and effective communication among fisheries scientists and information profession have to be established to sustain the fisheries information. The role of fisheries information in this context for the decision-makers, as well as for students and general community, is presented. The remarkable potential of Information Communication Technology, to communicate, store and manipulate information is emphasized.

KEYWORDS: Information services, Information retrieval, Aquaculture, Marine fisheries, Networking, Dissemination of Information, Information Technology, Communication

INTRODUCTION

Indonesia is a country comprising 17,508 islands straddled along the equator between the Indian and Pacific Oceans, and sandwiched between the continents of Asia and Australia. A country rich in natural resources, Indonesia's population stood at more than 205 (two hundred five) million people as of 1997 with more than 50% inhabiting the island of Java and the remainder distributed over Sumatra, Kalimantan, Sulawesi, Irian Jaya and other islands.

The long coastlines and extensive coastal boundaries of Indonesia provide a wide range of habitats for marine and freshwater animals of many types - fish, crustacea, mollusks - as well as various water-dwelling plants such as seaweeds which are of minor importance. In Indonesia, fish plays a vital role in the nutrition of people accounting for over 57% of animal protein intake to resource - poor rural farmers, who constitute 80% of the total population of Indonesia, including the Nangroe Aceh Darussalam (NAD) Province. According to the Statistik Indonesia (2003), in 2002 the number of households in NAD who work in marine fisheries was 11,788 families, whereas those who work in brackish water ponds was 13,521 families.

Adisukresno (1992) stated that marine and inland capture fisheries as well as coastal and freshwater aquaculture in Indonesia have been traditionally important economic activities, supplying a considerable contribution to in-country protein supply and export earning. The total fish production has increased from 1,647,664 tons with a value of Rp. 378,851 million in 1978 to over 2,670,000 tons with a value of 614,014 million in 1987; while the foreign exchange earnings for the same period has also increased from US\$ 193,424,000 to US\$ 712,199,000. Furthermore, according to the Statistik Indonesia 2003, the total fish production on 2001 was 5.1 million tons, comprising of 3.9 million tons of marine fisheries, and 1.1 million tons of land fisheries production. In the year 2002 the total number of fish production has increased around 4.15 percent, and has reached 5.3 million tons.

However, Cholik (1999) reported that despite the apparent increase in production, fisheries in Indonesia are facing various constraints. The densely populated coastal areas of NAD, together with extension of agriculture and industrial development, are stressing on the quantity and quality aspects of the natural system, which affects the sustainability of fisheries development in the area. The destruction of coastal habitats in NAD, such as wetlands is likely to lead to dramatic alteration of ecosystems, and may drastically degrade the environment quality and its capacity to support productive resource systems. Finally, the most destructive natural phenomena, the huge earthquake and colossal

tsunami wave that devastated the northern part of NAD - was proclaimed a national disaster - have very significant economic impacts for NAD. The decline in fish production from coastal areas of NAD waters due to tsunami and environmental degradation, combined with the lack of purchasing power, is resulting in declining protein intake in NAD Province, resulting in malnutrition.

COASTAL ZONES AND FISHERIES DEVELOPMENT IN NAD

The coastal water of NAD have been blessed with some of the world's richest ecosystems, characterized by high diversity of organisms and attributes of the environment which provide valuable benefits for fisheries aquaculture. With its extensive coral reefs, dense mangrove forests and coastal shelf, the coastal water of NAD is biologically the most productive environment that supports marine ecosystems. As reported in the AwF Aceh Project #2 (2005), NAD is one of the widest brackish water ponds provinces in Indonesia. Therefore, these coastal zones of NAD are highly populated areas because of the economic benefits that are derived from them. As the population increases, more people turn towards fishing as their form of livelihood.

The exploitation of marine and freshwater resources now figures prominently in the plans for economic and social development of this NAD province. Aquaculture has emerged as one of the fastest growing sub-sectors in the provincial agriculture industry over the last few years. According to Statistik Indonesia (2003), this was shown by land-based coastal aquaculture, which recorded a 58.3% increase in production from 1993 to 2002, and in the 2002 the NAD Province has produced 102,824 tons of marine fishes, and 13,448 tons of freshwater fishes. With catches from capture fisheries, particularly from coastal waters, reaching the maximum sustainable level, aquaculture is expected to play a more prominent role in providing a sufficient and cheap source of animal protein as well as a source of foreign exchange revenue for NAD.

As reported by the AwF Aceh Project # 1 (2005), before the tsunami of 26 December 2004, the farming of fish and shrimp in ponds in coastal ponds (locally known as tambaks) produced around 10,000 tons of shrimp and 6,000 tons of fish from over 45,000 ha of ponds. Preliminary assessments conducted in early 2005 indicate that over 50,000 people depended directly for employment on the aquaculture sector.

The NAD water resources activities have a dual objective in nature, namely, to serve both socio-economic development and ecological-environmental development. These dual but sometimes conflicting objective requires trade-offs-between them. To do this, alternative options should be considered at various levels of water resources decision-making. To obtain the most appropriate option, a compromise between the dual objectives has to be made. This can be achieved by the environmentally sound management of water resources activities which should be oriented towards the establishment of a long-equilibrium between the aquaculture activities and its environment.

IMPACTS OF TSUNAMI ON FISHERIES DEVELOPMENT

In the morning of 26 December 2004, an earthquake struck off the northwest coast of the Indonesian island of Sumatra. It spawned tsunamis and wreaked havoc along much of the rim of the Indian Ocean. Particularly hard-hit on the island were the NAD province and some parts of North Sumatra. The powerful colossal “tsunami” has destroyed the lush vegetation and marvelous beaches of the northern part of Sumatra, and those natural resources and all infrastructure may be lost in one hour’s battering of nature. This natural hazard has resulted in casualties of people and livestock, in damage to and destruction of the physical and built environment, in loss of crops and the disruption of infrastructure and social life.

More than three hundred thousand were affected by this natural hazard of geological and hydro-meteorological origins. This is the worst ever natural disaster in NAD. Furthermore, the AwF Aceh Project # 1 (2005), stated that the tidal waves unexpectedly smashed into the coastal areas from Aceh Besar to Pidie, Bireun and Aceh Utara, killing an estimated 100,000 people and thousands missing, causing heavy destruction and rendering more than a hundred thousand homeless. It caused devastating damage to infrastructure, human life and property as well as the state and cultural heritage.

In addition, the libraries on the eastern and southern coast were also not able to escape from this tragedy. The National Library of Indonesia (PNRI, 2005) as well as at least 17 public libraries were damaged by the tsunami, and 63 librarians were drowned. The building, collection and the furniture of the Banda Aceh Provincial library was severely damaged as water swept into its premises. Furthermore, it was reported that a few museums, where the information of traditional and other cultural heritage of the NAD have been kept, were also severely damaged.

An immense volume of water pushed up rivers which were at their strongest, throwing boats and small craft ashore, and plenty of native fishermen were drowned. According to FAO, as reported in the AwF Aceh Project # 1 (2005), the impacts of the tsunami on the aquaculture sector show that the tsunami has severely damaged or destroyed over 10,000ha of tambak ponds, caused lower levels of damage to 25,000 ha of tambak ponds and disrupted over 600 km of water supply canals.

The most damaging effects were waves which inundated the whole of the beach of the northern part of this province, which bordered the Indian Ocean. Many villages and towns were washed away. In NAD province, mostly people live in wooden houses, and their houses were easily floated and washed away, people and animals were drowned by inundation. A ship in a city was thrown as far as 3 miles along the highway. The tsunami waves traveled westward from the Strait of Malacca into the Indian Ocean around Thailand, India, and Sri Lanka.

Unlike river floods, the ground absorbs the sea water during inundation by tsunami, hence crops and plants can not be cultivated for a while after the recession of the sea water because of the salt remaining in fields. Inundation also brings the rotten mud from the seas bottom to the land.

THE NEED FOR FISHERIES & AQUACULTURE INFORMATION

There is a need for rehabilitation of small-scale shrimp hatcheries to support the livelihoods of people dependant on aquaculture, and the recovery of the Aquaculture sector. Not only is this urgent, but socially justified due to the large number of people involved. According to the Indonesia Tsunami Relief Portal (2005), that realizing this critical situation, early May 2005, the government of Indonesia has embarked on the huge project to rebuild tsunami devastated areas in Aceh and Nias, by establishing Aceh and Nias Rehabilitation and Reconstruction Agency (BRR), with its total budget of US \$7 billion.

The pilot project is the first step in restoring small-scale, traditional, aquaculture in these three villages, providing a learning experience for all concerned for subsequent expansion of activities in other villages and sub-districts in Pidie. Later, the project will be expanded in fisheries and aquaculture development towards improved productivity through intensive feeding of formulated diets, better pest management, water quality management, and utilization of open waters for aquaculture.

For the success of rehabilitating and restructuring the devastated areas of NAD, a large volume of background resource and fisheries information is required. In addition, information on land use, resource stocks, and environmental conditions is really needed and should be offered for individuals and agencies involved in the restructuring and rehabilitation of NAD.

Most of these fisheries and aquaculture information in Indonesia are collected by Government Departments and Statutory bodies, such as the Directorate General of Aquaculture (DGA), Ministry of Marine Affairs and Fisheries and distributed free of charge or on an exchange basis. However, due to budgetary constraints, only a limited number of copies are produced and distributed only to a selected group of people. Regrettably, in most cases such reports do not reach the right people.

The available fisheries and aquaculture publications in Indonesia range from the scientific monographs for specialists to leaflets for imparting instruction at the farm level. In between there are technical and professional publications on various aspects and journals for scientists.

COMMUNICATION AMONG SCIENTISTS IN FISHERIES AND AQUACULTURE

The communication networks, even though not known as such, have been in existence for many centuries in Indonesia, including NAD province. One of the earliest forms was the correspondence between scholars which, before the days of printing, was carried on across national boundaries. Such networks have continued to this day as one of the most effective communication techniques and are usually known as invisible colleges. The communication networks of the learned societies, including for scientists, researchers, practitioners on fisheries and aquaculture and related fields are publications and scientific journals.

Networking is one of the effective ways of communicating, exchanging, transferring and delivering information. Simply put, information networks constitute groups of individuals or organizations that share common interests and exchange information in various forms on a regular or organized basis. The sharing of resources is a practical way of utilizing available resources to meet the increasing demands for further information.

However, the use of information as a source knowledge on aquaculture and fisheries and related fields, still needs persuasion and motivation among the users. The development of an integrated network system of scientific and technological documentation and information, especially on aquaculture and fisheries, has been designated as one of the national priority activities in research, science and technology. Moreover, as oral communication is still a dominating factor in Indonesia it is necessary that an Information Center on Aquaculture and Fisheries, that will improve communication, information flow and networking among scientists, researchers, academicians, fishermen, and students of universities and institutions in the field of fisheries and aquatic research and development, should be established to respond to such needs.

Networking has indeed emerged as an effective tool for handling intractable problems in information management, especially in an area affected by natural disaster such as NAD Province. Networking is increasingly being accepted as a tool for exercising bibliographical control over published literature, for managing excessively large body of literature on fisheries and aquaculture development, and nature conservation of NAD. Networks will also help the institutions for sharing resources, coordination in planning of collection development, for managing fast and efficient transmission of data over geographically distant places.

Based on the assumption that cooperation between network members would lead to a saving in resources (human, material and financial) and to increased efficiency, networks not only meet various information needs, but also a valuable service in consolidating information all sources for specific purpose. Finally, the established networks among the scientists, researchers, practitioners on fisheries and aquaculture and related fields provide opportunities among them to observe and share their experiences, and to know

each other. These activities will improve their professional performance to become more productive and more competitive.

RESPONSE OF LIBRARIES FOR THE NAD NATURAL DISASTER

In response to the devastation of tsunami, members of the National Library of Indonesia (PNRI) and the Indonesian Library Association (IPI), have already come forward to assist displaced library workers by offering housing, jobs, and the cost of transportation. In addition, the PNRI has proposed an action plan to develop a few model libraries in the areas affected, providing them with modern information tools in addition to the conventional sources until now held by these libraries.

Funding Agencies, such as, Asia Foundation, the ASEAN Foundation, the Ford Foundation, the British Council, and other International funding organizations have been approached for financial support and library materials acquisition. The other research institutions as well as universities in Indonesia and also other ASEAN member countries should be asked for donations/exchanges of published materials from those institutions.

The long-term objective will be to guide and assist these libraries to function as modern libraries using ICT and more libraries will be included in the project depending on the support received by the National Library of Indonesia. Although the PNRI strategy is based on the contributions and support of the Indonesian government, foreign financial assistance, other foreign library associations and well wishers would be welcome as necessary supplements to these efforts.

DISCUSSION AND CONCLUSIONS

The need of harnessing information, as an essential support to various activities relating to forecasting, planning, policy making, execution, conducting research and development activities of fisheries and aquaculture development in NAD is being recognized by the Indonesian government, especially to support the successful implementation of the Aceh and Nias Rehabilitation and Reconstruction Project.

With the shift of the primary development of libraries from central to local government and to local people, each region will urgently need up-to-date information and information services, without having Central Government funds. Given the explosion of new information sources and electronic technologies, and ongoing constraints on financial resources, resource-sharing networking have emerged as an important alternative for coping.

Notwithstanding such obstacles, the Indonesian libraries and librarians must prepare for the information globalization era. Libraries should be skilled enough to handle the more sophisticated tasks of information retrieval, analysis and dissemination, and be ready to adopt new technologies. If the librarians are not themselves ready, library users may not

be able to maximize the use of the vast array of technologies that access digital information efficiently. Librarians should be trained and capable of acting as mediators between users and the technologies to retrieve information their clientele request.

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